Accounting for nearfield exposure to chemicals in consumer products in LCA

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14:15 *Olivier Jolliet*, *Peter Fantke*, *Lei Huang* and *Alexi Ernstoff*
Accounting for near-field exposure to chemicals in consumer products in LCA
SPEAKER: *Olivier Jolliet*

ABSTRACT. Every consumer product has the potential to expose humans to chemical ingredients during use, via multiple exposure pathways. However, many product oriented exposure assessment accounts mostly for indirect environmental exposure and not direct exposure of consumer to product during use. We therefore aim to a) Identify the most efficient interface between LCI and LCIA for the use and disposal stage of consumer products, b) determine the chemical concentration in product as an LCI input, c) define and calculate the Product Intake Fraction (PiF), a metric that accounts for near field exposure in LCA:, d) demonstrate the framework and models through examples from various consumer products. We propose to first determine the mass of chemical in product per functional unit (FU) as inventory flow and point of departure to then calculate intake and impact. This inventory flow is the amount of product used per FU multiplied by the chemical content in product. This content is either based on measured data, derived from household product databases, or determined based on chemical -product specific function and frame formulations. Intakes are then determined using the product intake fractions - the fraction of the chemical in product that is taken in via each exposure pathway, considering the specific point of entry (cosmetics, chemical in article, indoor air, etc.). We propose a new near & far field multi-media matrix of transfer fractions, with one column and row for each point of entry, for each environmental compartment and for each exposure pathway. The multiple transfer and product intake fraction (e.g from chemical in article to inhalation of indoor air) is obtained by inverting the transfer fraction matrix, yielding the infinite multi-media transfer fractions. Product intake fraction range from 10e-7 for an SVOC in a thick flooring, to 5e-3 for an indoor air emission up to 96% for a leave-on cosmetic ingredient.

14:30 *Susan A. Csiszar*, *Alexi S. Ernstoff*, *Peter Fantke*, *Olivier Jolliet*, *Jane Bare* and *David Meyer*
Near-field exposure factor modeling of chemicals in personal care products
SPEAKER: *Susan A. Csiszar*

ABSTRACT. It has been estimated that there are thousands of chemicals used in personal care products (PCPs) and human exposure to these